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Description

The present invention relates to display systems, and specifically to a portable display system which includes a collapsible frame having display supports thereon which provide a smooth display surface.

A number of display systems are known which are both portable and collapsible. These systems typically include a number of elongate arms attached at their ends to articulation blocks or nodes which allow for the folding of the frame to a collapsed condition. Some of the known systems provide for curvature to be imparted to the frame. Such systems have provided a display capability not previously possible in that they can be constructed to form a full size display which can be collapsed to a compact shape for storage or transport. However, the systems are often complex in construction and therefore expensive. They are also limited in that each system is typically capable of only a single display configuration. Further, the systems do not always provide a smooth display surface, regardless of whether the desired surface is to be flat or curved. Finally, even though the systems are described as portable, they are frequently not capable of easy packing and transporting on commercial, passenger airlines.

It is an object of the present invention to overcome the drawbacks and limitations of the prior art proposals. More specifically, the invention has, as its objects:

- (1) to provide a portable display system having a frame which may be disposed in a planar, curved or circular pattern, as desired by the user;
- (2) to develop a display system which is less complex and therefore less expensive than existing designs;
- (3) to provide a display system with display supports which extend along a face of a frame to provide a smooth display surface;
- (4) to provide, on display supports, a mechanism for interlocking multiple frames together along the edges thereof, while providing for a flexible arrangement of frames in a desired configuration.

According to the present invention a portable display system comprises a collapsible rectangular frame, having a top, a bottom, opposed, spaced apart sides and a front face and a rear face, including a plurality of rectangular box units, each unit having a top side, bottom side, right side, left side, forward face and rearward face, wherein the top side, bottom side, right side and left side may be shared with adjoining box units, the top side, bottom side, right side and left side each being defined by a pair of arms, the arms in each pair being joined to one another by a scissor connection intermediate their ends and connector block nodes located at each corner of the box units, each of the nodes including pivot means for securing

the arms thereto and for allowing collapsing of the frame to a compact form is characterized in that the top side arms and the bottom side arms further include a telescoping member in at least one of the arms of an arm pair and that the system further comprises plural display supports extending along files of connector block nodes on the front face of the frame, each support extending between adjacent connector block nodes and including a pair of display-support runners, the runners being joined to one another at one, central end thereof by a central hinge and joined to a connector block node at the other end thereof by an end hinge.

The invention will now be described further, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view of the display system of the invention, shown in a curved condition.

Fig. 2 is a partial side elevation of the display system, taken generally along the line 2-2 of Fig. 1.

Fig. 3 is a plan view of an exterior surface of a connector block node of the invention.

Fig. 4 is a plan view of an interior surface of a connector block node of the invention.

Fig. 5 is an enlarged, interior side view of the frame of the invention, with portions broken away to show detail.

Fig. 6 is a greatly enlarged, fragmentary view of a telescoping member of the invention, with portions broken away to show detail.

Fig. 7 is an enlarged top-plan view of a two-axis hinge of the invention.

Fig. 8 is a side elevation of the display system in a collapsed condition.

Fig. 9 is a side elevation of the display system in a collapsed condition with the rear display supports folded along side the frame.

Fig. 10 is a rear-plan elevation of a portion of a display support showing a frame interlocking mechanism of the invention.

Fig. 11 is a section through a display support, taken generally along line 11-11 of Fig. 10.

Fig. 12 is a partial side elevation of the frame interlocking mechanism, taken generally along the line 12-12 of Fig. 10.

Fig. 13 is a partial side elevation of the display system showing an accessory attachment mechanism.

Turning now to the drawings, and initially to Fig. 1, the portable display system of the invention is shown generally at 10. System 10 includes a frame 12 which, in the preferred embodiment is generally rectangular and has a top 14, a bottom 16, and opposed, spaced-apart sides including left side 18 and right side 20. A front face 22 is visible in Fig. 1 while a rear face 24 is on the opposite side of the frame.

Frame 12 is made up of a plurality of rectangular box units, such as box units 26, 28, 30, 32, 34, 36, 37

and 38. Eight additional, unnumbered, box units comprise the rest of frame 12.

Each box unit, and now referring to box unit 26, has a top sid 26a, a bottom side 26b, a left sid 26c, a right sid 26d, a forward face 26e and a rearward face 26f.

Each of the box unit sides is defined by a pair of arms, such as arm pair 40, 42, on the top and bottom, respectively, and 44, 46, on the left and right sides, respectively. The arm pairs which make up the right and left sides include arms 48, 50 while the arms which make up arm pairs 40, 42 include arms 54, 56 and scissor connection 58. Arms 54, 56 are constructed to telescope, to enable frame 12 to be curved. To this end, each telescoping arm, and now referring to arm 54 in Figs. 1 and 6, includes a large-diameter element 60 and a small-diameter element 62. Small-diameter element 62 is received within large-diameter element 60. Arm 54 is secured to arm 56 by scissor connection 58 which includes a scissor pin 64. Because the presence of scissor pin 64 would limit the amount of travel of small-diameter element 62 and large-diameter element 60, small-diameter element 62 is provided with a slot 66 which is fittable around pin 64 and allow the small-diameter element to be fully received in a large diameter element.

The provision of telescoping arms 54, 56 allows flexing of frame 12 in either direction, or in an S-curve. The provision of a telescoping mechanism in a single arm of the top and bottom arm pairs enables the frame to be curved in a single direction only. This configuration may be used in special situations, or where it is desirable to produce a less costly display system.

Referring now to Figs. 3 and 4, a connector-block node of the invention is shown generally at 70. It should be understood that all of the nodes in the frame are identically constructed. A node, such as node 70, is located at each corner of each box unit. Each node includes a vertically disposed axis 72 and a horizontally disposed axis 74. Axes 72 and 74 are perpendicular to one another. A second-horizontal axis 76 extends orthogonally to axes 72, 74.

Each node has an exterior surface 78, which is arranged to face outward from the frame. Each node also includes an interior surface 80 which faces toward the interior of the frame. A bore 82 extends through the node between the exterior and interior surfaces thereof, with the center of the bore being collinear with the second-horizontal, or bore, axis 76. In the preferred embodiment, bore 82 includes a key way or notch 84 located at the upper margin thereof. The bore also includes a beveled area 86 which allows the countersinking of devices which are received in the bore, which will be described later herein.

A lateral perimeter 88 extends about the periphery of node 70 between the exterior and interior surfaces. Node-interlock means, shown generally at 90, are provided about the lateral perimeter of each node

and interlock with like means located on adjacent nodes when the frame is in a collapsed condition, or when multiple frames are joined into a single display. In the preferred embodiment, interlock means includes a series of protrusions, such as protrusions 92 which extend outward beyond the perimeter of the node. The protrusions are conformal with, and nestable in, detents such as detents 94 which are located on adjacent nodes. When a frame is in a collapsed condition, the protrusions on one node nest in the detents in an adjacent node to prevent shifting of the nodes relative to one another. This construction provides for a rigid structure which is easily packed and shipped.

Referring now to Fig. 3, an end-hinge receiver 96 is depicted on the exterior surface of the node. Receiver 96 includes, in the preferred embodiment, four flanges 98 which extend normally to exterior surface 78. Each flange has a pair of bores 100, 102 therein, whose purpose will be described later herein.

Referring now to Fig. 4, each node includes pivot means, shown generally at 104, which are used to secure the arms of the box units to the nodes and to allow collapsing of the frame to a compact, or collapsed, condition. Pivot means includes plural receptacles, such as receptacles 106, 108, 110 and 112, which are arranged in a generally cruciform shape, offset across the adjacent axis (72 or 74) on opposed sides of the node. Each receptacle, and now referring to receptacle 106, includes a pair of opposed, spaced apart walls 114, 116 which extend parallel to a node axis, and a base 118 adjacent the center of the node. A node pin 120 is provided to secure an arm to the node and is received in a bore 122 in exterior wall 116 and screws into a stepped bore 124 on interior wall 114. Node pin 120 spans the space between receptacle walls 114, 116. Receptacles 106-112 are arranged about a central region, shown generally at 126 which includes bore 82 therein.

Referring now to Figs. 2 and 5, additional connector-block nodes are depicted at 126, 128, 130, 132, 134, 136 and 138. A connection rod 140 extends between selected, front and rear face opposing connector-block nodes, such as nodes 70 and 132 in Fig. 2 and nodes 136, 138 in Fig. 5. Connection rods 140 are operable to maintain a predetermined, spaced distance between opposing nodes in the front and rear face of the frame, thereby maintaining the frame in an expanded condition.

Connection rods 140 are rotatably secured to the interior side of a connector-block node on one face of the frame and are detachably secured to the interior side of a connector-block node on the other face. Such securing is accomplished by means of a connection-rod pin, such as pin 142, which is received in bore 82 of node 136, and is rotatable therein. Connection rod 140 has a hollow interior and is fictionally fixed on connection-rod pin 142.

The other end of connection rod 140 has a key way 144 therein and is installable over a connection-rod fastener 146, which is received in bore 82 of node 138. Fastener 146 has a dog 148 which interlocks with notch 84 in node 138, preventing rotation of fastener 146. A key 150 is provided on fastener 146 and is receivable in key way 144 to secure connection rod 140 to connection rod fastener 146. Fastener 146 includes detachable-fastener means for receiving connection rod 140 thereon.

Referring now to Figs. 2, 5 and 10, a display support, or strut, of the invention is depicted generally at 150. Referring momentarily to Fig. 1, it may be seen that plural display supports extend along files of connector-block nodes on the front face of the frame. The display supports are flexibly attached to the connector-block nodes and are intended to remain so attached.

Each support extends between adjacent connector-block nodes, such as nodes 130, 132 in Fig. 2, and includes a pair of display support runners 152, 154, which are joined to each other at one, central end, 152a, 154a by a central hinge 156. The other ends 152b, 154b are joined to end-hinge receivers 96 on the nodes by an end hinge 158.

Referring now to Figs. 5, 10 and 11, the display supports and associated structures will be described in more detail. The display support runners, and now referring to Fig. 11, have a substantially C-shaped cross section and include a strap portion 160, sides 162, 164, which are arranged perpendicularly to the strap portion and, opposed, spaced apart flange portions 166, 168 which extend along the length of the runner and are substantially parallel to the strap portion and normal to the sides.

Center hinge 156, now referring to Fig. 5, is constructed to allow outward folding of the display supports from the front face of the frame when the frame is collapsed. Each central hinge includes a first hinge portion 170, a second hinge portion 172, and a hinge pin 174. Portions 170 and 172 are of identical construction and include a first element 176 which is designed to be received in a display support runner, and a second element 178 which extends substantially perpendicularly 10 to the first element and which includes plural flanges across the width thereof, similarly to those of the end-hinge receiver.

An abutting face 180 is located on second element 178 and is constructed so that the runners, received on first elements 176 will be aligned to a straight condition when the hinge is in its fully opened condition, as depicted in Fig. 5. The abutting faces on each central hinge portion are conformal with one another, as are the flanges on the second element of each central hinge portion.

Runners 152, 154 each have an opening 182, 184 which align with and receive protrusions 186, 188 which are located on the central hinge portions and

the end hinges, respectively. Protrusions 186, 188 extend through openings 182, 184 in order to hold the central hinge element and end hinge element in place in the runner.

With the frame in an expanded, open, condition, display supports 150 form a continuous, flat support down a file of nodes. If the frame is in a straight-line configuration, the display supports align in a planar configuration across front face 22 of the frame. If the frame is in a curved configuration, the display supports form lines which are part of a smooth curve, extending across the front face of the frame.

Referring now to Fig. 2, display supports 190 are attached to the connection nodes at either end, on the sides, of frame 12 on the rear face 24 thereof. Display supports 190 are constructed identically to display supports 150, however, they are attached to the nodes by means of a two-axis hinge 192. Referring now to Fig. 7, hinge 192 will be described in greater detail. Two-axis hinge 192 includes a first two-axis element 194 and a second two-axis element 196.

First two-axis element 194 includes a conformal coupling portion 198 which is conformal with and receivable in end-hinge receiver flanges 98. A two-axis receiver portion 200 includes plural hinge flanges 202 which extend laterally outward from coupling portion 198. Coupling portion 198 includes flanges 199 which mesh with flanges 98. First axis element 194 is secured to node 70 by means of pins 204 which pass through bores 100, 102 in flanges 98 and through similar bores in flanges 199.

Second two-axis element 196 has a coupler 206 which has flanges 208 which are conformal with and receivable in two-axis receiver portion 200 hinge flanges 202. An end-hinge receiver portion 208 includes plural flanges 210, which are constructed similarly to flanges 98, to receive an end hinge 158 therein. As depicted in Fig. 7, the frame is in a collapsed condition, with display support 190 extending outwardly from the rear face of frame 12. As shown in the phantom lines in Fig. 7, display support 190 has been partially folded along side of the collapsed frame.

To complete the description of hinge 192, first two-axis element 194 is secured to node 70 in a relatively stationery condition by pins 204. Second two-axis element 196 is rotatably fixed to the first element by a hinge pin 212 which extends along a first axis 214. End hinge 158 is attached to the second two-axis element by a second pin 216 which extends along a second axis 218, which is normal to the first axis. This arrangement provides that the display supports on the rear face of the frame, when the frame is in a collapsed condition, expand outwardly from the rear face of the frame and may be folded along side of the collapsed frame to further compact the system. Referring now to Fig. 8, the frame is shown from the same observed position as Fig. 2, in a collapsed condition. Display supports 150 and 190 are shown ex-

tending outwardly from the front and rear faces, respectively, of the frame. Additionally, the interlocking of node interlock means 90 may be observed as protrusions 92 nest in detents 94, thereby holding the nodes relative to one another when the frame is in a collapsed condition.

Turning now to Fig. 9, rear display supports 190 are shown folded along side of frame 12. In this condition, the frame may be placed upright on two-axis hinges 192, which are capable of supporting the weight of the frame. This is deemed to be more convenient for transporting than requiring that the frame rest on its top, bottom, or either side. Thus, the two-axis hinges of the invention provide a protective device for the rear display supports by allowing the supports to be folded along side of the display for transportation.

Referring now to Fig. 2, another component of the display system is a web, 220 which is attached to display supports 150, across the front face of the frame, and extends around the sides of the frame to the rear display supports 190. The web may be attached to the display support runners by a variety of attachment means. In the preferred embodiment, attachment means includes magnets 222, which are secured to web 220 in predetermined locations to align with display support runner straps 160. As the runners are made from a ferrous metal material, the magnets will attach to the runners, thereby holding the web in place. A portion of the web is trained around the ends of the display and secured to the runners of display supports 190 for cosmetic reasons, to provide a more finished appearance to the display.

Referring now to Figs. 10 and 11, frame interlock means of the invention is shown generally at 224. Frame interlock means are located on the display support runners at the ends of a frame. Interlock means include a latch, or latch means 226 which is pivotably mounted on a latch carrier 228, which is received in a display support runner. A latch pin 230 extends through a bore 232 in latch 226 and provides a mechanism for allowing latch 226 to pivot on carrier 228. A second bore 234 is provided in latch 226 in the event that it is necessary to provide more distance between runners on adjacent frames.

Latch 226 has a notch 236 which cooperates with a latch pin 230, which is received on a latch pin carrier 238 on a second runner. As shown in Fig. 10, when latch 226 is secured across latch pins on adjacent runners, two frames are held together such that the node interlock means on one frame cooperates with the node-interlock means on another frame to provide a stable structure. On any given frame, the display supports at one end of the frame are equipped with latches and latch carriers while the supports at the other end of the frame are equipped with latch pins and latch pin carriers.

Turning now to Figs. 10 and 13, another feature

of the end hinges will be described. In Fig. 13, box unit 26 is partially displayed, along with nodes 240 and 242. Two end hinges 244 and 246 are fixed to nodes 240, 242, respectively. An accessory pole 248, having a first part 250, a second part 252 telescopically received therein, and an accessory, such as lamp 254. Accessory pole 248 is received and retained in a slot 256 located in each end hinge, which slot is best depicted in Fig. 10. Pole 248 may be used to support any number of devices, such as projection screens, hanging displays, etc.

Thus, a display system has been disclosed which provides a smooth display surface, may be formed in a curved configuration, and may be easily collapsed for shipping.

Claims

20. 1. A portable display system (10) comprising a collapsible rectangular frame (12), having a top (14), a bottom (16), opposed, spaced apart sides (18, 20) and a front face (22) and a rear face (24) including a plurality of rectangular box units (26, 28, 30, 32, 34, 36, 37, 38), each unit having a top side (26a), bottom side (26b), right side (26d), left side (26c), forward face (26e) and rearward face (26f) wherein the top side (26a), bottom side (26b), right side (26d) and left side (26c) may be shared with adjoining box units, the top side (26a), bottom side (26b), right side (26d) and left side (26c) each being defined by a pair of arms (40, 42 and 44, 46), the arms in each pair being joined to one another by a scissor connection (58) intermediate their ends and connector block nodes (70) located at each corner of the box units, each of the nodes ((70) including pivot means (72, 74) for securing the arms (40, 42) thereto and for allowing collapsing of the frame to a compact form characterized in that the top side arms (40) and the bottom side arms (42) further include a telescoping member (54, 56) in at least one of the arms of an arm pair and that the system further comprises plural display supports (150) extending along files of connector block nodes (70) on the front face of the frame, each support (150) extending between adjacent connector block nodes (70) and including a pair of display-support runners (152, 154), the runners being joined to one another at one, central end (152a, 154a) thereof by a central hinge (156) and joined to a connector block node at the other end thereof by an end hinge (158).
35. 2. A system according to claim 1, characterized in that each of the nodes (70) includes perpendicular node axes (72) and the pivot means (104) includes plural receptacles (106, 108, 110, 112) ar-

- 9 ranged in a generally cruciform shape, offset across the adjoining axis (72 or 74) on opposing sides of the node (70), each receptacle (106, 108, 110, 112) including a pair of opposed, spaced apart walls (114, 116), extending parallel to a node axis and having a base (118) adjacent the center of the node (70) and a node pin (120) spanning the space between the receptacle walls.
3. A system according to claim 2, characterized in that the receptacles (106, 108, 110, 112) are arranged about a central region (126), the region having a bore (82) extending therethrough, the bore having an axis (76) perpendicular to the node axes (72, 74).
4. A system according to claim 3, characterized in that the node (70) has an exterior surface (78), facing outward from the frame and an interior surface (80), facing toward the interior of the frame, the exterior surfacing having an end-hinge (158) receiver (96) thereon for receiving the end hinges therein.
5. A system according to claim 4, characterized in that it includes, on the rear face (24) of the frame (12), on the sides only (18, 20), a file of display supports which are connected, at their other ends, to the node units (70) by a two-axis hinge (192).
6. A system according to claim 1 or 5, characterized in that it comprises a web (220) and wherein the display supports (150) include attachment means (222) thereon for securing the web (220) to the frame (12).
7. A system according to claim 6, characterized in that the attachment means includes magnets (222) to secure the web (220) to the display supports (150).
8. A system according to claim 3, characterized in that it includes on selected, front and rear face opposing connector block nodes (70, 132 and 136, 138), connection rods (140) which are rotatably secured to the interior side of a connector block node on one face and which is detachably secured to the interior side of a connector block node of the other face.
9. A system according to claim 8, characterized in that a connection rod pin (142) is received in the connector block node bore (82) on one face of the frame (12) and the connection rod (140) is frictionally fixed on the connection rod pin (142) and a connection rod fastener (146) is rotatably fixed in the connection rod bore (82) on the other face
- 10 of the frame and includes detachable fastener means for the connection rod (140).
11. A system according to any preceding claim, characterized in that the connection rod other end has a keyway (144) formed in a side thereof and the connection rod fastener has a key (150) thereon receivable in the keyway (144) to secure the connection rod (140) to the connection rod fastener (146).
12. A system according to any preceding claim, characterized in that each node (70) has an exterior surface (78), facing outward from the frame (12), an interior surface (80), facing toward the interior of same frame (12), the exterior surface having an end-hinge receiver (96) thereon including plural flanges (98) extending outwardly from the node exterior surface and plural display supports (150) extending along files of connector block nodes (70) on the front face of the frame (12), each support extending between adjacent connector block nodes (70) and including a pair of display-support-runners (152, 154), the runners being joined to one another at one, central end (152a, 154a) thereof by a central hinge (156) and joined to the end-hinge receiver (96) at the other end thereof by an end hinge (158).
13. A system according to claim 11, characterized in that the runners (152, 154) are elongate and have a substantially C-shaped cross section, including a strap portion (160), sides (162, 164) which are arranged perpendicularly to the strap portion and opposed, spaced apart flange portions (166, 168) extending along the length of the runners, substantially parallel to the strap portion and the center hinge (156) and the end hinges (158) are constructed and arranged to provide outward folding of the display supports from the front face of the frame when the frame is collapsed.
14. A system according to claim 12, characterized in that the runners (152, 154) have an opening (182, 184) in the strap portion (160) adjacent each end of the runner, the end and center hinges have elements which are received within the cross section of the runners (152, 154) and the elements each have a protrusion thereon which extends through the opening to retain the elements in place.
15. A system according to claim 13, characterized in that the central hinge (156) includes a first hinge portion (170) received on a first runner and second hinge portion (172) received on a second runner, each central hinge portion includes a first element (176) which is received in the runner and a second element (178) which extends substan-

- tially perpendicularly to the first element and includes an abutting face (180) thereon which contacts a conformal face on a second hinge element on another hinge portion, such that the runners attached to the hinge portions will be aligned in a straight condition between adjacent connector block nodes.
15. A system according to claim 14, characterized in that it includes, on the rear face of the frame, on the sides only, a file of display supports (190) which are connected, at their ends, to the nodes by a two-axis hinge (192).
16. A system according to claim 15, characterized in that two-axis hinge (192) includes a first two-axis element (194) which has a conformal coupling portion, which is conformal with and receivable in the end hinge receiver on a node and a two-axis receiver portion (200), which includes plural hinge-flanges (202), extending laterally outwardly from a coupling portion (198) and a second two-axis element (196) which has a coupler (206), which is conformal with and receivable in the two-axis receiver portion (200) and an end-hinge receiver (208) which is constructed and arranged to receive an end hinge (158) therein, the first two-axis element (194) being relatively stationarily fixed to the node, the second two-axis element (196) being rotatably fixed to the first two-axis element (194) by a pin (204) extending along a first axis in the conformal coupling portion and wherein an end hinge (158) is attached to the second two-axis element (196) by a second pin (216) extending along a second axis (218) which is perpendicular to the first axis (214), such that the display supports on the rear face of the frame, with the frame in a collapsed condition, extend outwardly from the rear face of the frame and are foldable along side of the collapsed frame to further compact the system.
17. A system according to claim 11, characterized in that each of the nodes (70) includes a lateral perimeter (88) extending between the exterior and interior surfaces, perpendicular node axes (72, 74) and the pivot means (104) which further includes plural receptacles (106, 108, 110, 112), arranged in a generally cruciform shape, offset across the adjoining axis on opening sides of the nodes, each receptacle including a pair of opposed, spaced-apart walls (114, 116) extending parallel to a node axis and having a base (118) adjacent the center of the node, a node pin (120) spanning the space between the receptacle walls to secure an arm (40, 42) to the node and wherein each node has, about the lateral perimeter thereof, node interlock means (90) for interlocking with like means on adjacent nodes when the frame is in a collapsed condition to prevent shifting of the nodes relative to one another.
- 5 18. A system according to claim 17, characterized in that interlock means (90) includes a protrusion (92) on one node which is conformal with and nestable in a detent (94) in an adjacent node with the frame in a collapsed condition.
- 10 19. A system according to claim 18, characterized in that it includes frame-interlock means (224) located on the runners (152, 154) at the ends of a frame, the frame interlock means including latch means (226) located on a runner at one end of the frame and catch means for securing the latch means thereto located on a runner at the other end of the frame, the frame-interlock means providing a mechanism for securing plural frames together such that the node-interlock means one frame co-operate with the node-interlock means on another frame to provide a stable structure.
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Patentansprüche

1. Tragbares Display-System (10) mit einem zusammenlegbaren Rahmen (12), mit einem Oberteil (14), einem Unterteil (16), einander gegenüberliegenden, beabstandeten Seiten (18, 20) und einer vorderen Fläche (22) und einer hinteren Fläche (24), einschließlich einer Vielzahl von rechteckigen Kasteneinheiten (26, 28, 30, 32, 34, 36, 37, 38), wobei jede Einheit eine obere Seite (26a), eine untere Seite (26b), eine rechte Seite (26d), eine linke Seite (26c), eine vordere Fläche (26e) und eine hintere Fläche (26f) aufweist, wobei die obere Seite (26a), die untere Seite (26b), die rechte Seite (26d) und die linke Seite (26c) mit benachbarten Kasteneinheiten geteilt werden können, wobei die obere Seite (26a), die untere Seite (26b), die rechte Seite (26d) und die linke Seite (26c) je durch ein Paar Arme (40, 42 und 44, 46) gebildet sind, wobei die Arme jedes Paares miteinander durch eine Scherenverbindung (58) zwischen ihren Enden und Verbinderblockknoten (70) verbunden sind, die in jeder Ecke der Kasteneinheiten angeordnet sind, wobei jeder der Knoten (70) Schwenkmittel (72, 74) umfaßt, um die Arme (40, 42) daran zu befestigen und um es zu gestatten, daß sich der Rahmen zu einer kompakten Form zusammenlegen läßt, dadurch gekennzeichnet, daß die Oberseitenarme (40) und die Unterseitenarme (42) weiterhin ein Teleskop-element (54, 56) in mindestens einem der Arme eines Armpaares umfassen und daß das System weiterhin mehrere Displayträger (150) umfaßt, die sich entlang Reihen von Verbinderblockkno-

- ten (70) an der Vorderseite des Rahmens erstrecken, wobei sich jeder Träger (150) zwischen benachbarten Verbinderblockknoten (70) erstreckt und ein Paar von Displayträgerschienenen (152, 154) umfaßt, wobei die Schienen miteinander an einem zentralen Ende (152a, 154a) davon mittels eines zentralen Scharniers (156) verbunden sind und mit einem Verbinderblockknoten an dem anderen Ende davon mittels eines Endscharniers (158) verbunden sind.
2. System nach Anspruch 1, dadurch gekennzeichnet, daß jeder der Knoten (70) senkrechte Knotenachsen (72) umfaßt und das Schwenkmittel (104) mehrere Aufnahmen (106, 108, 110, 112) umfaßt, die in einer im allgemeinen kreuzförmigen Gestalt, über die angrenzende Achse (72 oder 74) an sich gegenüberliegenden Seiten des Knotens (70) versetzt sind, wobei jede Aufnahme (106, 108, 110, 112) ein Paar von sich gegenüberliegenden, beabstandeten Wänden (114, 116) aufweist, die sich parallel zu einer Knotenachse erstrecken, und eine Basis (118), die benachbart dem Zentrum des Knoten (70) liegt und einen Knotenstift (120) besitzt, der den Raum zwischen den Aufnahmewänden überspannt.
 3. System nach Anspruch 2, dadurch gekennzeichnet, daß die Aufnahmen (106, 108, 110, 112) um einen zentralen Bereich (126) angeordnet sind, wobei der Bereich eine Bohrung (82) aufweist, die sich dort hindurch erstreckt, wobei die Bohrung eine Achse (76) rechtwinklig zu den Knotenachsen (72, 74) aufweist.
 4. System nach Anspruch 3, dadurch gekennzeichnet, daß der Knoten (70) eine Außenfläche (78) aufweist, die von dem Rahmen nach außen gewandt ist, und eine Innenfläche (80), die zum Inneren des Rahmens gewandt ist, wobei die Außenfläche eine Aufnahme (96) für das Endscharnier (158) aufweist, um die Endscharniere darin aufzunehmen.
 5. System nach Anspruch 4, dadurch gekennzeichnet, daß es auf der Rückseite (24) des Rahmens (12) nur an den Seiten (18, 20) eine Reihe von Displayträgern aufweist, die an ihren anderen Enden mit den Knoteneinheiten (70) mittels eines Zweiachsenscharniers (192) verbunden sind.
 6. System nach Anspruch 1 oder 5, dadurch gekennzeichnet, daß es einen Steg (220) aufweist und die Displayträger (150) Befestigungsmittel (222) daran aufweisen, um den Steg (220) an dem Rahmen (12) zu befestigen.
 7. System nach Anspruch 6, dadurch gekennzeich-

net, daß die Befestigungsmittel Magneten (222) aufweisen, um den Steg (220) an den Displayträgern (150) zu befestigen.

- 5 8. System nach Anspruch 3, dadurch gekennzeichnet, daß es an ausgewählten vorder- und hinterseitigen, sich gegenüberliegenden Verbinderblockknoten (70, 132 und 136, 138) Verbindungsstangen (140) aufweist, die drehbar an der Innenseite eines Verbinderblockknotens an einer Fläche befestigt sind und lösbar an der Innenseite eines Verbinderblockknotens der anderen Fläche befestigt sind.
- 10 15. 9. System nach Anspruch 8, dadurch gekennzeichnet, daß ein Verbindungsstangenstift (142) in der Verbindungsstangenbohrung (82) auf einer Fläche des Rahmens (12) aufgenommen ist und die Verbindungsstange (140) kraftschlüssig an dem Verbindungsstangenstift (142) befestigt ist und ein Verbindungsstangenbefestigungselement (146) drehbar in der Verbindungsstangenbohrung (82) an der anderen Fläche des Rahmens befestigt ist und lösbare Befestigungselemente für die Verbindungsstange (140) aufweist.
- 20 25 10. System nach Anspruch 9, dadurch gekennzeichnet, daß das andere Ende der Verbindungsstange eine Keilnut (144) aufweist, die in einer Seite davon ausgebildet ist und das Verbindungsstangenbefestigungselement einen Keil (150) daran aufweist, der in der Keilnut (144) aufnehmbar ist, um die Verbindungsstange (140) an dem Verbindungsstangenbefestigungsmittel (146) zu befestigen.
- 30 35 11. System nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß jeder Knoten (70) eine Außenoberfläche (78), die nach außen von dem Rahmen (12) gerichtet ist, eine Innenfläche (80) aufweist, die zu dem Inneren des Rahmens (12) gerichtet ist, wobei die Außenfläche eine Endscharnieraufnahme (96) daran aufweist, mit mehreren Flanschen (98) aufweist, die sich nach außen von der Knotenoberfläche erstrecken und mit mehreren Displayträgern (150), die sich entlang von Reihen von Verbinderblockknoten (70) auf der Vorderseite des Rahmens (12) erstrecken, wobei sich jeder Träger zwischen benachbarten Verbinderblockknoten (70) erstreckt, und mit einem Paar von Displayträgerschienenen (152, 154), wobei die Schienen miteinander an einem zentralen Ende (152a, 154a) davon durch ein zentrales Scharnier (156) verbunden und an der Endscharnieraufnahme (96) an dem anderen Ende davon durch ein Endscharnier (158) verbunden sind.
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12. System nach Anspruch 11, dadurch gekennzeichnet, daß die Schienen (152, 154) länglich sind und einen im wesentlichen C-förmigen Querschnitt aufweisen, der einen Gurtbereich (160), Seiten (162, 164), die senkrecht zu dem Gurtbereich angeordnet sind und einander gegenüberliegende, beabstandete Flanschbereiche (166, 168) aufweist, die sich entlang der Länge der Schienen im wesentlichen parallel zu dem Gurtbereich erstrecken, und das zentrale Scharnier (156) und die Endscharniere (158) so gestaltet und angeordnet sind, daß sie für ein Herausklappen der Displayträger aus der Vorderfläche des Rahmens sorgen, wenn der Rahmen zusammengelegt wird.
13. System nach Anspruch 12, dadurch gekennzeichnet, daß die Schienen (152, 154) eine Öffnung (182, 184) in dem Gurtbereich (160) benachbart jedem Ende der Schiene aufweisen, wobei die End- und Zentralscharniere Elemente aufweisen, die innerhalb des Querschnitts der Schienen (152, 154) aufgenommen sind, und die Elemente jeweils einen Vorsprung darauf aufweisen, der sich durch die Öffnung erstreckt, um die Elemente in ihrer Lage zu halten.
14. System nach Anspruch 13, dadurch gekennzeichnet, daß das Zentralscharnier (156) einen ersten Scharnierbereich (170), der auf einer ersten Schiene aufgenommen ist, und einen zweiten Scharnierbereich (172) aufweist, der auf einer zweiten Schiene aufgenommen ist, jeder zentrale Scharnierbereich ein erstes Element (176), das in der Schiene aufgenommen ist, und ein zweites Element (178) aufweist, das sich im wesentlichen senkrecht zu dem ersten Element erstreckt und eine Anlagefläche (180) daran aufweist, welche eine konforme Fläche auf einem zweiten Scharnierelement auf einem anderen Scharnierbereich berührt, so daß die an den Scharnierbereichen befestigten Schienen in einem geraden Zustand zwischen benachbarten Verbinderblockknoten ausgerichtet sind.
15. System nach Anspruch 14, dadurch gekennzeichnet, daß es auf der hinteren Fläche des Rahmens nur an den Seiten eine Reihe von Displayträgern (190) aufweist, die an ihren Enden mit den Knoten mittels eines Zweiachsenscharniers (192) verbunden sind.
16. System nach Anspruch 15, dadurch gekennzeichnet, daß das Zweiachsenscharnier (192) ein erstes Zweiachsenelement (194), das einen konformen Kopplungsbereich aufweist, der mit der Endscharnieraufnahme auf einem Knoten konform und in dieser aufnehmbar ist, und einen

Zweiachsenaufnahmeb reich (200), der mehr re Scharnierflansche (202) aufweist, die sich seitlich nach außen von ihm Kopplungsbereich (198) erstrecken, und ein zweites Zweiachsenelement (196), das einen Koppler (206) aufweist, der mit dem Zweiachsenaufnahmebereich (200) konform und in diesem aufnehmbar ist und eine Endscharnieraufnahme (208) aufweist, die so gestaltet und angeordnet ist, um ein Endscharnier (158) darin aufzunehmen, wobei das erste Zweiachsenelement (194) an dem Knoten relativ ortsfest befestigt ist, das zweite Zweiachsenelement (196) an dem ersten Zweiachsenelement (194) mittels eines Stifts (204) drehbar befestigt ist, der sich entlang einer ersten Achse in dem konformen Kopplungsbereich erstreckt, und wobei ein Endscharnier (158) an dem zweiten Zweiachsenelement (196) mittels eines zweiten Stifts (216) befestigt ist, der sich entlang einer zweiten Achse (218) erstreckt, die rechtwinklig zu der ersten Achse (214) verläuft, so daß sich die Displayträger an der hinteren Fläche des Rahmens, wenn sich der Rahmen in einem zusammengelegten Zustand befindet, nach außen von der hinteren Fläche des Rahmens erstrecken und entlang des zusammengelegten Rahmens klappbar sind, um das System noch kompakter zu machen.

17. System nach Anspruch 11, dadurch gekennzeichnet, daß jeder der Knoten (70) einen seitlichen Umfang (88), der sich zwischen den Außen- und Innenflächen erstreckt, senkrechte Knotenachsen (72, 74) und das Schwenkmittel (104) aufweist, das weiterhin mehrere Aufnahmen (106, 108, 110, 112) aufweist, die in einer im allgemeinen kreuzförmigen Gestalt über der angrenzenden Achse auf Öffnungsseiten der Knoten versetzt angeordnet sind, wobei jede Aufnahme ein Paar von sich gegenüberliegenden, beabstandeten Wänden (114, 116) umfaßt, die sich parallel zu einer Knotenachse erstrecken und eine Basis (118) in der Nähe des Zentrums des Knoten aufweisen, wobei ein Knotenstift (120) den Raum zwischen den Aufnahmewänden überspannt, um einen Arm (40, 42) an dem Knoten zu befestigen, und wobei jeder Knoten rund um seinen seitlichen Umfang ein Knotenverriegelungsmittel (90) für die Verriegelung mit gleichen Mitteln an benachbarten Knoten aufweist, wenn sich der Rahmen in einem zusammengelegten Zustand befindet, um ein Verschieben der Knoten relativ zu einander zu verhindern.

18. System nach Anspruch 17, dadurch gekennzeichnet, daß das Verriegelungsmittel (90) einen Vorsprung (92) auf einem Knoten aufweist, der mit einer Vertiefung (94) in einem benachbarten Knoten konform und in dieser einsetzbar ist,

wenn sich der Rahmen in einem zusammengelegten Zustand befindet.

19. System nach Anspruch 18, dadurch gekennzeichnet, daß es Rahmenverriegelungsmittel (224) aufweist, die sich auf den Schienen (152, 154) an den Enden eines Rahmens befinden, wobei die Rahmenverriegelungsmittel Einrastmittel (226), die sich auf einer Schiene an einem Ende des Rahmens befinden, und Sperrmittel zum Befestigen der Einrastmittel daran aufweisen, die sich auf einer Schiene am anderen Ende des Rahmens befinden, wobei die Rahmenverriegelungsmittel einen Mechanismus für das Miteinanderbefestigen von mehreren Rahmen schaffen, so daß die Knotenverriegelungsmittel eines Rahmens mit den Knotenverriegelungsmitteln auf einem anderen Rahmen zusammenwirken, um eine stabile Struktur zu schaffen.

Revendications

- Système publicitaire portatif (10), comprenant un cadre rectangulaire repliable (12) présentant un côté supérieur (14), un côté inférieur (16), des côtés opposés espacés l'un de l'autre (18, 20) et une face avant (22) et une face arrière (24) comportant une pluralité d'unités de casier rectangulaires (26, 28, 30, 32, 34, 36, 38), chaque unité présentant un côté supérieur (26a), un côté inférieur (26b), un côté droit (26d), un côté gauche (26c), une face avant (26e) et une face arrière (26f), le côté supérieur (26a), le côté inférieur (26b), le côté droit (26d) et le côté gauche (26c) pouvant être partagés avec des unités de casier adjacentes, le côté supérieur (26a), le côté inférieur (26b), le côté droit (26d) et le côté gauche (26c) étant définis, chacun, par une paire de bras (40, 42 et 44, 46), les bras de chaque paire étant assemblés l'un à l'autre par une connexion en ciseaux (58) entre leurs extrémités et des noeuds à segments de connexion (70) situés à chaque coin des unités de casier, chacun des noeuds (70) comportant un moyen pivot (72, 74), destiné à fixer les bras (40, 42) et à permettre le repliement du cadre en une forme compacte, caractérisé en ce que les bras latéraux supérieurs (40) et les bras latéraux inférieurs (42) comportent, par ailleurs, un élément télescopique (54, 56) dans au moins l'un des bras d'une paire de bras et que le système comprend, par ailleurs, une pluralité de supports de publicité (150) s'étendant le long de files de noeuds à segments de connexion (70) sur la face frontale du cadre, chaque support (150) s'étendant entre des noeuds à segments de connexion adjacents (70) et comportant une paire de glissières à support de

publicité (152, 154), les glissières étant reliées l'un à l'autre, à une extrémité centrale (152a, 154a) de celles-ci, par une articulation centrale (156) et reliées à un noeud à segments de connexion à leur autre extrémité, par une articulation d'extrémité (158).

- Système suivant la revendication 1, caractérisé en ce que le noeud (70) comporte des axes de noeud perpendiculaires (72) et que le moyen pivot (104) comporte une pluralité de logements (106, 108, 110, 112) disposés selon une forme généralement cruciforme, décalés par rapport à l'axe contigu (72 ou 74) sur des côtés opposés du noeud (70), chaque logement (106, 108, 110, 112) comportant une paire de parois opposées espacées l'une de l'autre (114, 116) s'étendant parallèles à un axe de noeud et présentant une base (118) adjacente au centre de noeud (70) et une goupille de noeud (120) surplombant l'espace entre les parois de logement.
- Système suivant la revendication 2, caractérisé en ce que les logements (106, 108, 110, 112) sont disposés autour d'une zone centrale (126), la zone présentant un alésage (82) s'étendant à travers celle-ci, l'alésage présentant un axe (76) perpendiculaire aux axes de noeud (72, 74).
- Système suivant la revendication 3, caractérisé en ce que le noeud (70) présente une surface extérieure (78), orientée vers l'extérieur par rapport au cadre et une surface intérieure (80), orientée vers l'intérieur du cadre, la surface extérieure présentant un récepteur (96) d'articulation d'extrémité (158) destiné à recevoir les articulations d'extrémité.
- Système suivant la revendication 4, caractérisé en ce qu'il comprend, sur la face arrière (24) du cadre (12), uniquement sur les côtés latéraux (18, 20), une file de supports de publicité qui sont connectés, à leurs autres extrémités, aux unités de noeud (70) par une articulation à deux axes (192).
- Système suivant la revendication 1 ou 5, caractérisé en ce qu'il comprend une toile (220) et dans lequel les supports de publicité (150) comportent un moyen de fixation (222) destiné à fixer la toile (220) sur le cadre (12).
- Système suivant la revendication 6, caractérisé en ce que le moyen de fixation comporte des aimants (222) destinés à fixer la toile (220) sur les supports de publicité (150).
- Système suivant la revendication 3, caractérisé

- en ce qu'il comporte, sur des noeuds à segments de connexion opposés des faces avant et arrière choisis (70, 132 et 136, 138), des barres de connexion (140) qui sont fixées, de manière rotative, sur le côté intérieur d'un noeud à segments de connexion sur une face et qui sont fixées de manière amovible, sur le côté intérieur d'un noeud à segments de connexion de l'autre face.
9. Système suivant la revendication 8, caractérisé en ce qu'une goupille de barre de connexion est reçue dans l'alésage de noeud à segments de connexion (82) sur une face du cadre (12) et que la barre de connexion (140) est fixée à friction sur la goupille de barre de connexion (142) et qu'un dispositif de fixation de barre de connexion (146) est fixé, de manière rotative, dans l'alésage de barre de connexion (82) sur l'autre face du cadre et comporte un moyen de fixation amovible de la barre de connexion (140).
10. Système suivant la revendication 9, caractérisé en ce que l'autre extrémité de la barre de connexion présente un passage à goupille (144) formé dans l'un de ses côtés et que le dispositif de fixation de barre de connexion présente une goupille (150) recevable dans le passage à goupille (144) pour fixer la barre de connexion (140) au dispositif de fixation de barre de connexion (146).
11. Système suivant l'une ou l'autre des revendications précédentes, caractérisé en ce que chaque noeud (70) présente une surface extérieure (78), orientée vers l'extérieur par rapport au cadre (12), une surface intérieure (80), orientée vers l'intérieur du même cadre (12), la surface extérieure présentant un récepteur (96) d'articulation d'extrémité comportant une pluralité de brides (98) s'étendant vers l'extérieur par rapport à la surface extérieure du noeud et une pluralité de supports de publicité (150) s'étendant le long de files de noeuds à segments de connexion (70) sur la face avant du cadre (12), chaque support s'étendant entre des noeuds à segments de connexion adjacents (70) et comportant une paire de glissières de support de publicité (152, 154), les glissières étant assemblées l'une à autre, à une extrémité centrale de celles-ci, par une articulation centrale (156) et assemblées au récepteur (96) d'articulation d'extrémité à l'autre de leurs extrémités par une articulation d'extrémité (158).
12. Système suivant la revendication 11, caractérisé en ce que les glissières (152, 154) sont allongées et présentent une section sensiblement en forme de C, comportant une partie de bride (160), des
- 5 côtés (162, 164) qui sont disposés perpendiculairement à la partie de bride et des parties de bride opposées espacées l'une de l'autre (166, 168) s'étendant sur la longueur des glissières, sensiblement parallèles à la partie de bride et que l'articulation centrale (156) et les articulations d'extrémité (158) sont réalisées et disposées de manière à créer un repliement vers l'extérieur des supports de publicité par rapport à la face avant du cadre lorsque le cadre est replié.
13. Système suivant la revendication 12, caractérisé en ce que les glissières (152, 154) présentent une ouverture (182, 184) dans la partie de bride (160) adjacente à chaque extrémité de la glissière, que les articulations d'extrémité et centrale présentant des éléments qui sont reçus dans la section des glissières (152, 154) et que les éléments présentent, chacun, une saillie qui s'étend à travers l'ouverture, pour retenir l'élément en place.
14. Système suivant la revendication 13, caractérisé en ce que l'articulation centrale (156) comporte une première partie d'articulation (170) reçue sur une première glissière et une seconde partie d'articulation (172) reçue sur une seconde glissière, que chaque partie d'articulation centrale comporte un premier élément (176) qui est reçu sur la glissière et un second élément (178) qui s'étend sensiblement perpendiculaire au premier élément et comporte une face attenante (180) qui vient en contact avec une face concordante sur un second élément d'articulation sur une autre partie d'articulation, de sorte que les glissières fixées sur les parties d'articulation seront alignées en ligne droite entre les noeuds à segments de connexion adjacents.
15. Système suivant la revendication 14, caractérisé en ce qu'il comporte, sur la face arrière du cadre, uniquement sur les côtés, une file de supports de publicité (190) qui sont connectés, à leurs extrémités, aux noeuds par une articulation à deux axes (192).
16. Système suivant la revendication 15, caractérisé en ce que l'articulation à deux axes (192) comporte un premier élément à deux axes (194) qui présente une partie d'accouplement concordante, qui est concordante avec et recevable dans le récepteur d'articulation d'extrémité sur un noeud et une partie de récepteur à deux axes (200) qui comporte une pluralité de brides d'articulation (202) s'étendant latéralement vers l'extérieur par rapport à une partie d'accouplement (198) et un second élément à deux axes (196) qui présente un coupleur (206) qui est concordant avec et recevable dans la partie de récepteur à

deux axes (200) et un récepteur d'articulation d'extrémité (208) qui est réalisé et disposé de manière à recevoir une articulation d'extrémité (158), le premier élément à deux axes (194) étant fixé de manière relativement stationnaire sur le noeud, le second élément à deux axes (196) étant fixé de manière rotative sur le premier élément à deux axes (194) par une goupille (204) s'étendant le long d'un premier axe dans la partie d'accouplement concordante et dans lequel une articulation d'extrémité (158) est fixée au second élément à deux axes (196) par une seconde goupille (216) s'étendant le long d'un second axe (218) qui est perpendiculaire au premier axe (214), de telle manière que les supports de publicité sur la face arrière du cadre, avec le cadre en position repliée, s'étendent vers l'extérieur par rapport à la face arrière du cadre et peuvent être pliés le long du cadre replié, pour compacter davantage le système.

17. Système suivant la revendication 11, caractérisé en ce que chacun des noeuds (70) comporte un périmètre latéral (88) s'étendant entre les surfaces extérieures et intérieures, des axes de noeud perpendiculaires (72, 74) et le moyen pivot (104) qui comporte, par ailleurs, une pluralité de logements (106, 108, 110, 112), disposés selon une forme généralement cruciforme, décalé sur l'axe contigu des côtés d'ouverture des noeuds, chaque logement comportant une paire de parois opposées espacées l'une de l'autre (114, 116) s'étendant parallèles à un axe de noeud et présentant une base (118) adjacente au centre du noeud, une goupille de noeud (120) surplombant l'espace entre les parois de logement, pour fixer un bras (40, 42) au noeud, dans lequel chaque noeud présente, autour de son périmètre latéral, un moyen d'interverrouillage de noeud (90) destiné à l'interverrouillage avec un moyen similaire sur des noeuds adjacents lorsque le cadre est à l'état replié, afin d'éviter un déplacement des noeuds l'un par rapport à l'autre.

18. Système suivant la revendication 17, caractérisé en ce que le moyen d'interverrouillage (90) comporte une saillie (92) sur un noeud qui est concordante avec et peut s'engager dans une entaille (94) dans un noeud adjacent, à l'état replié.

19. Système suivant la revendication 18, caractérisé en ce qu'il comporte un moyen d'interverrouillage de cadre (224) situé sur les glissières (152, 154), aux extrémités d'un cadre, le moyen d'interverrouillage de cadre comportant un moyen de verrou (226) situé sur une glissière, à une extrémité du cadre, et un moyen de loquet destiné à fixer le moyen de verrou situé sur une glissière à

l'autre extrémité du cadre, le moyen d'interverrouillage de cadre créant un mécanisme pour fixer une pluralité de cadres, de manière que le moyen d'interverrouillage de noeuds sur un cadre coopère avec le moyen d'interverrouillage de noeuds sur un autre cadre, afin de créer une structure stable.

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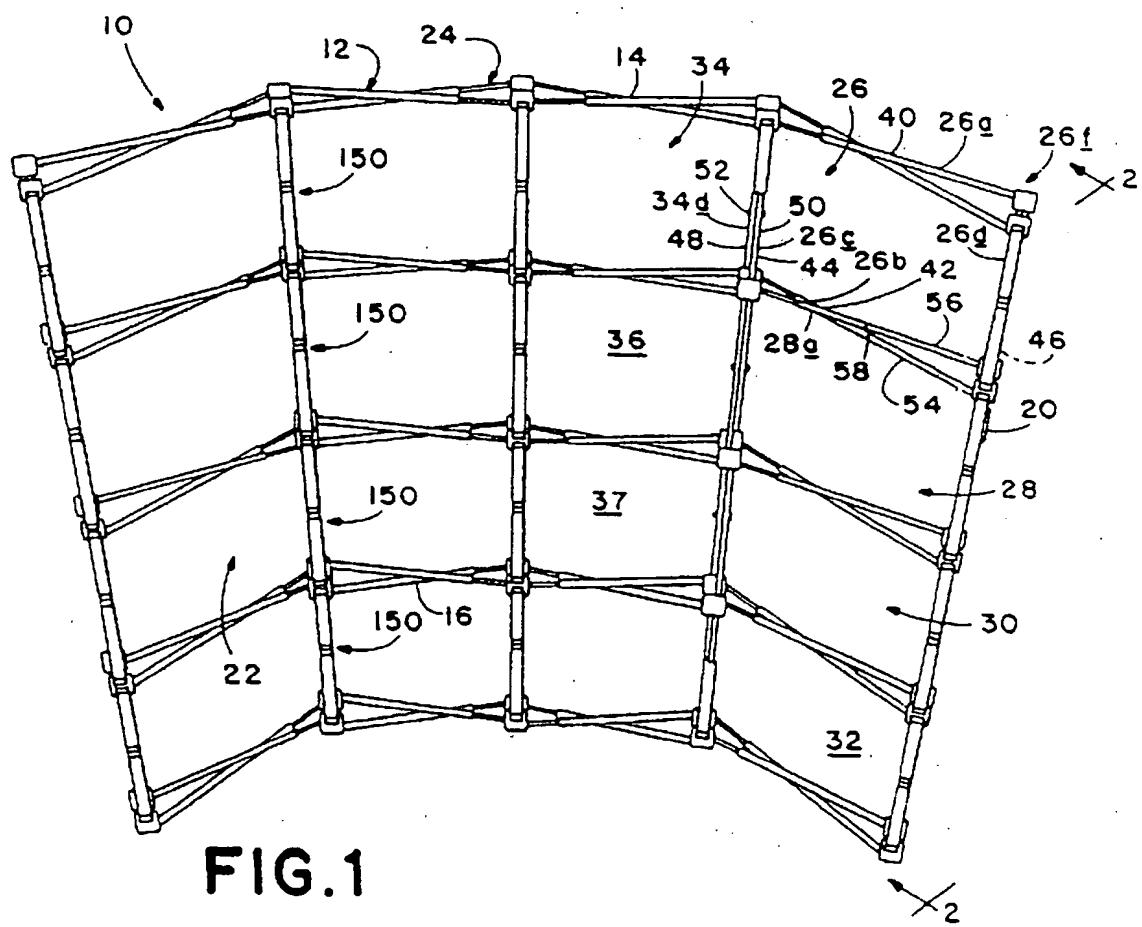


FIG.1

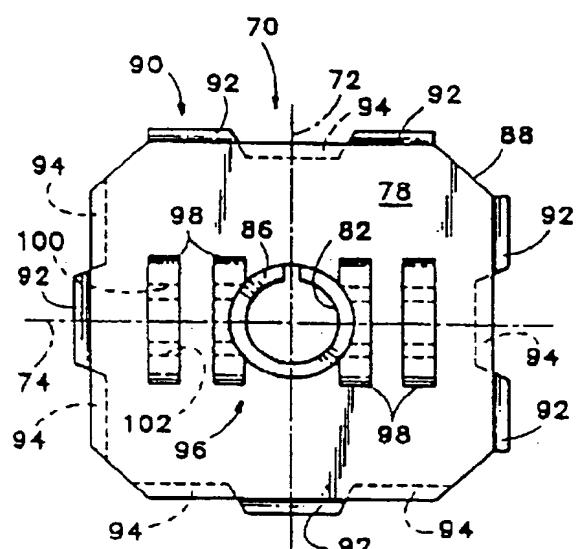


FIG.3

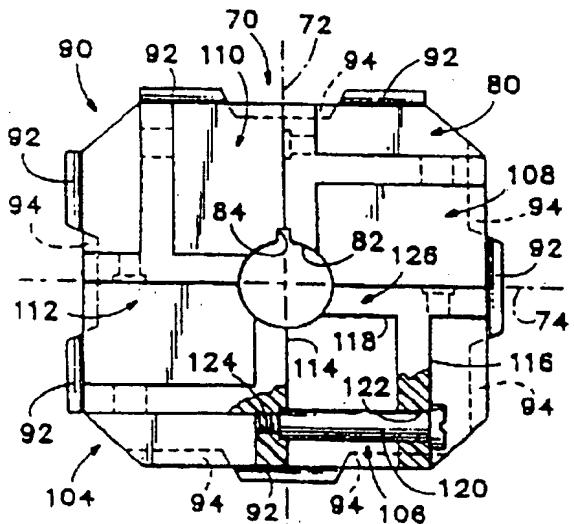


FIG. 4

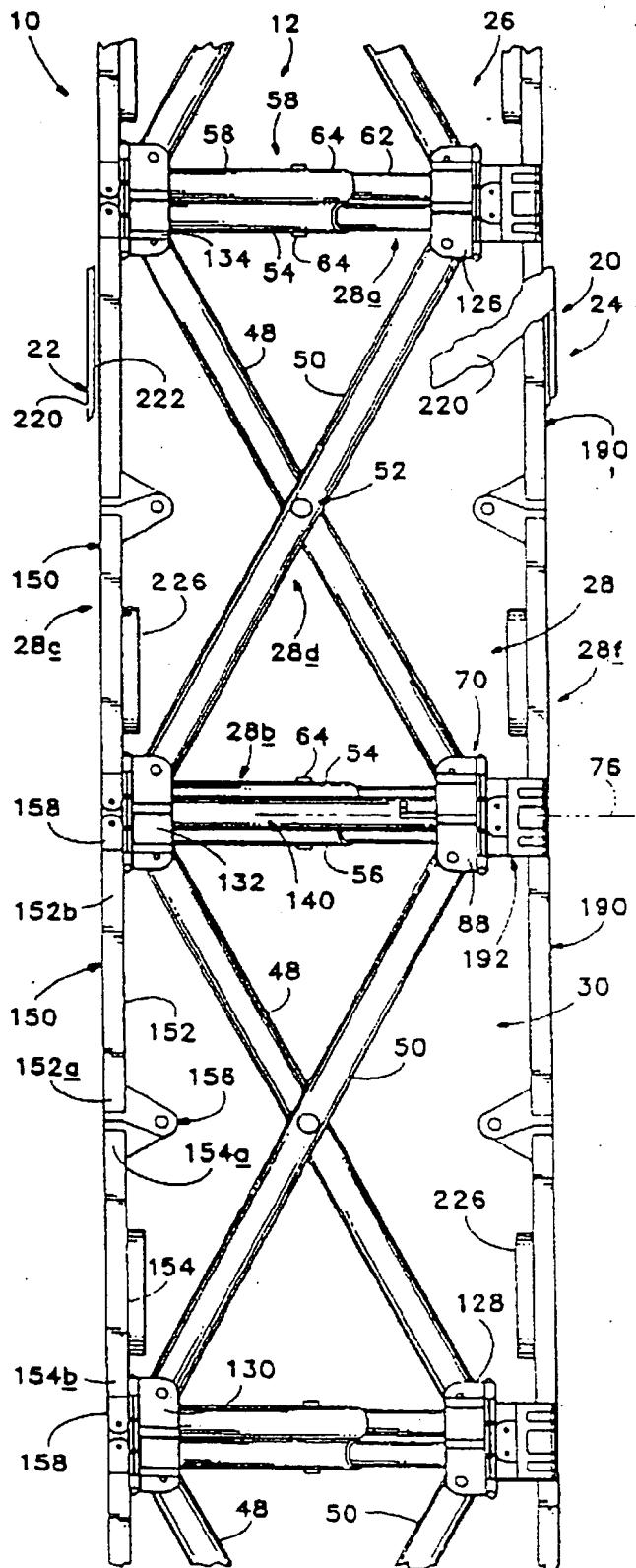


FIG. 2

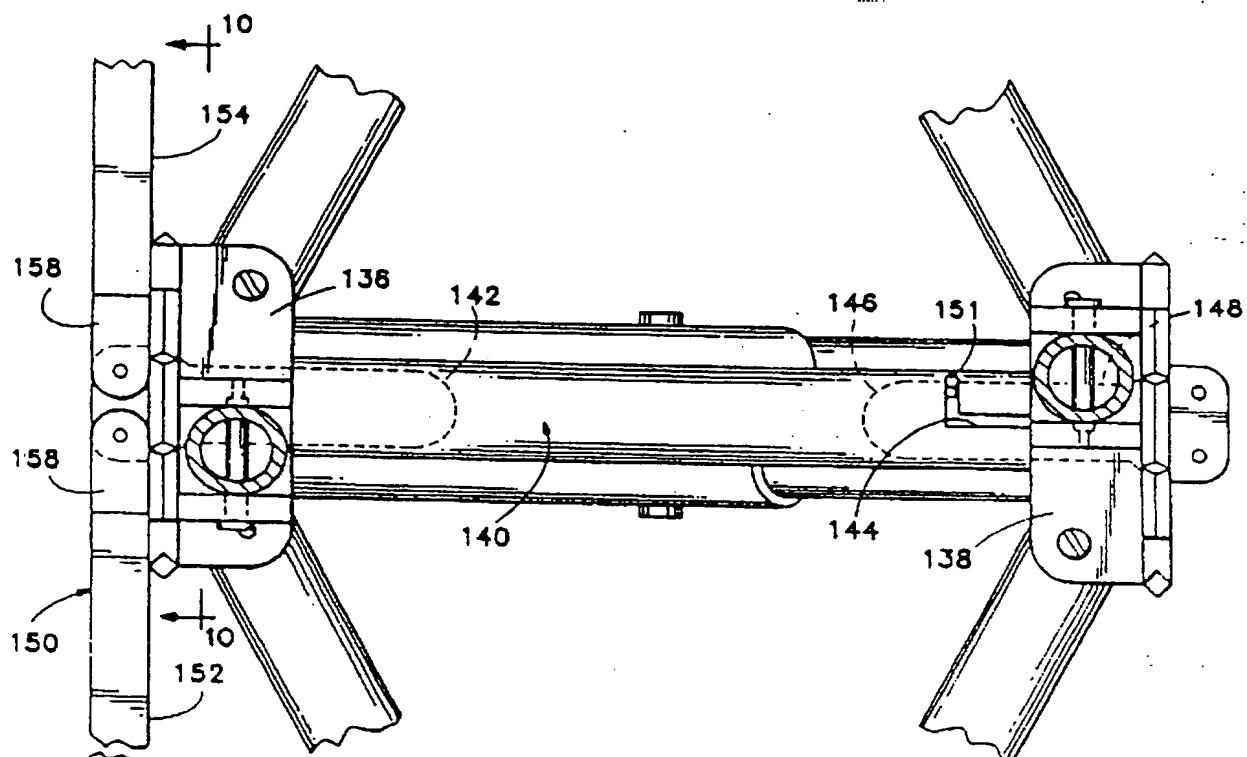


FIG. 5

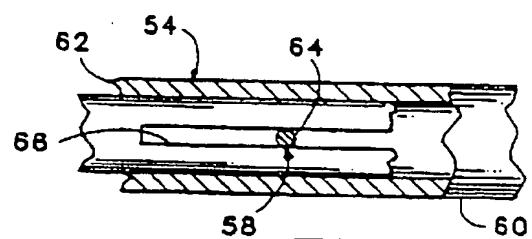
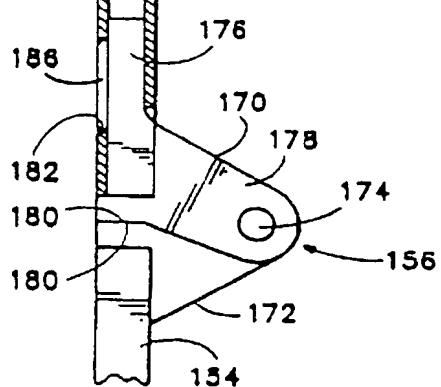
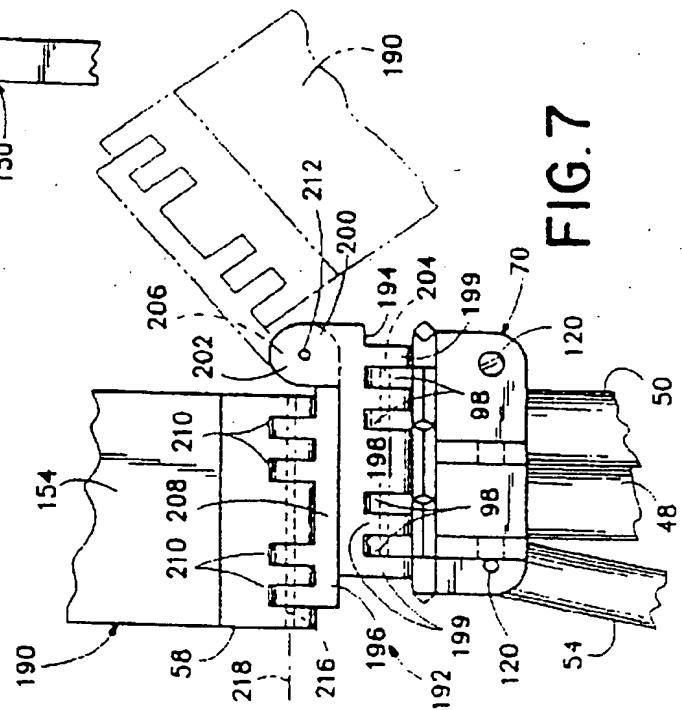
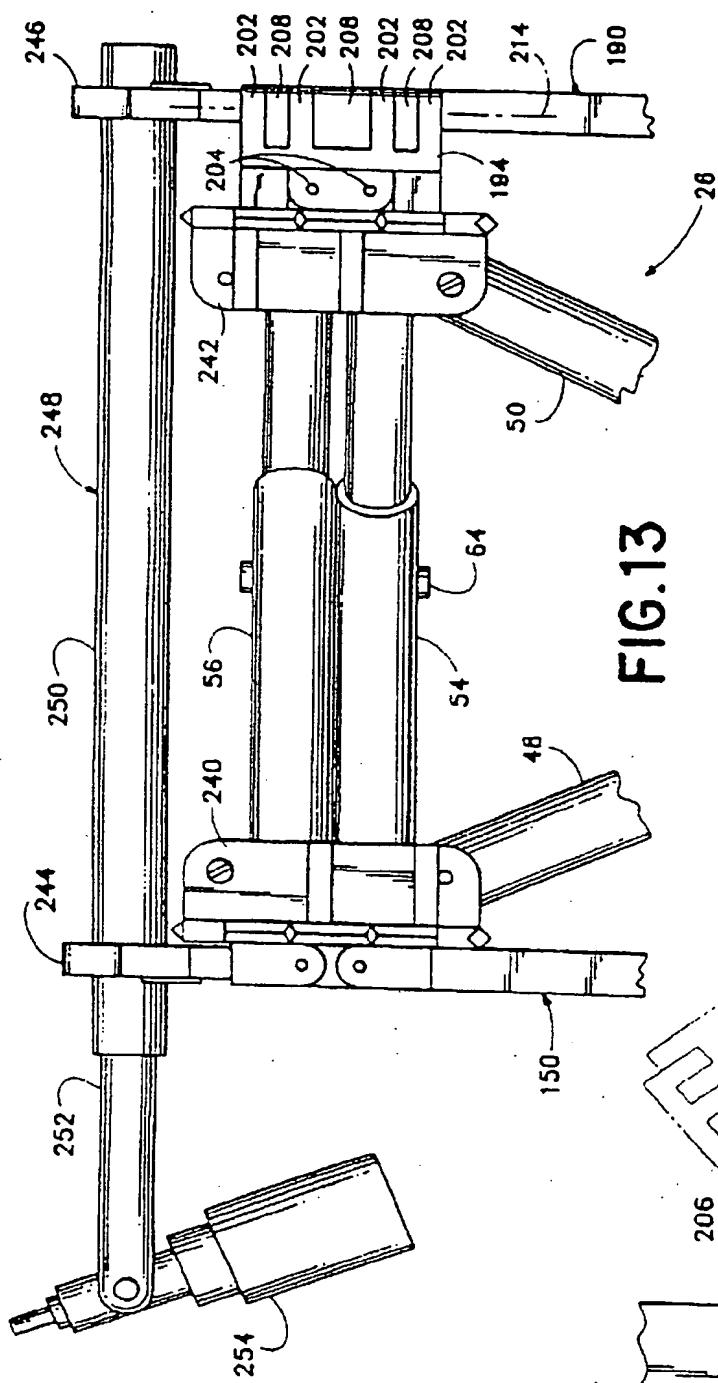


FIG. 6



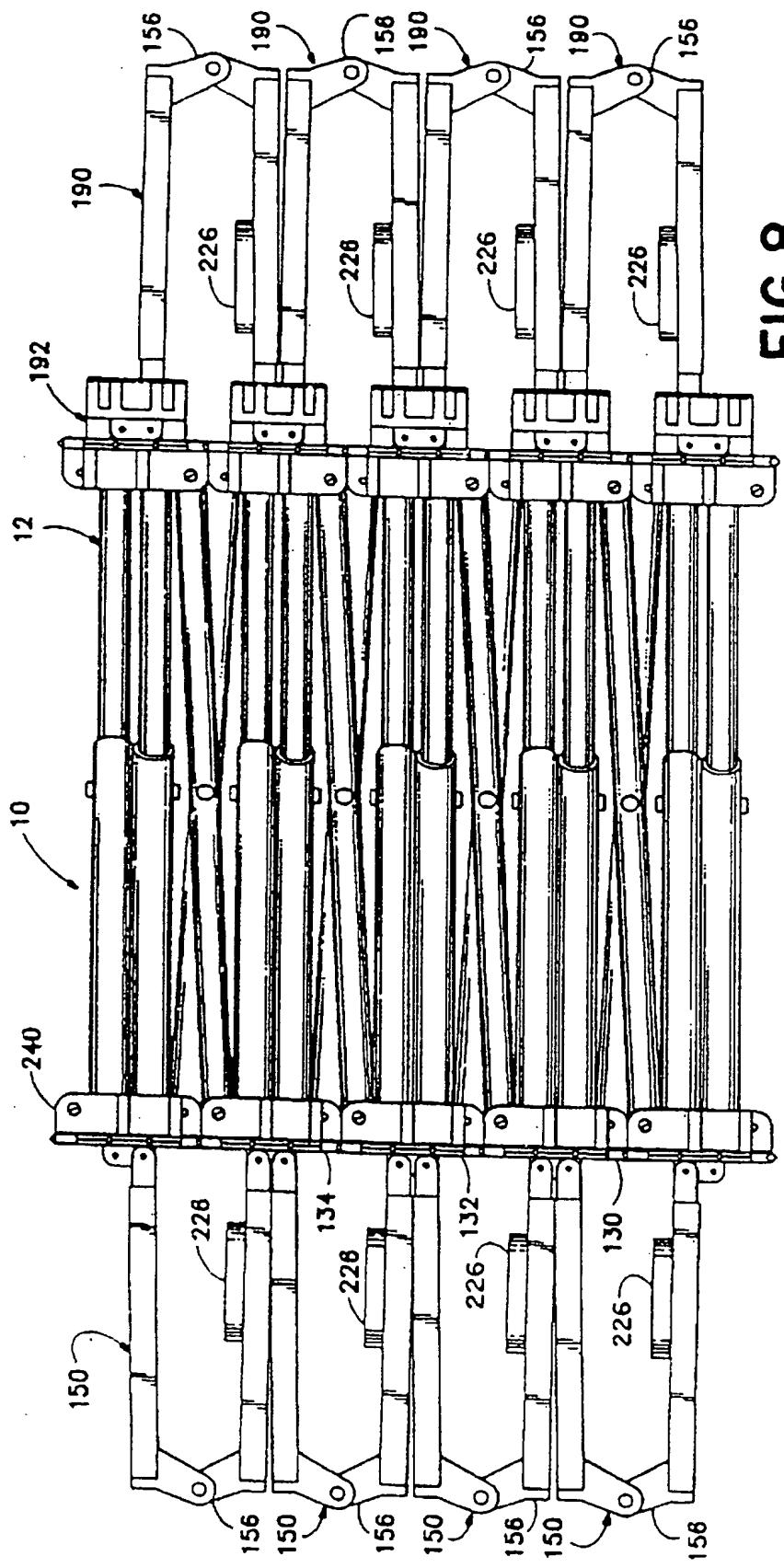


FIG. 8

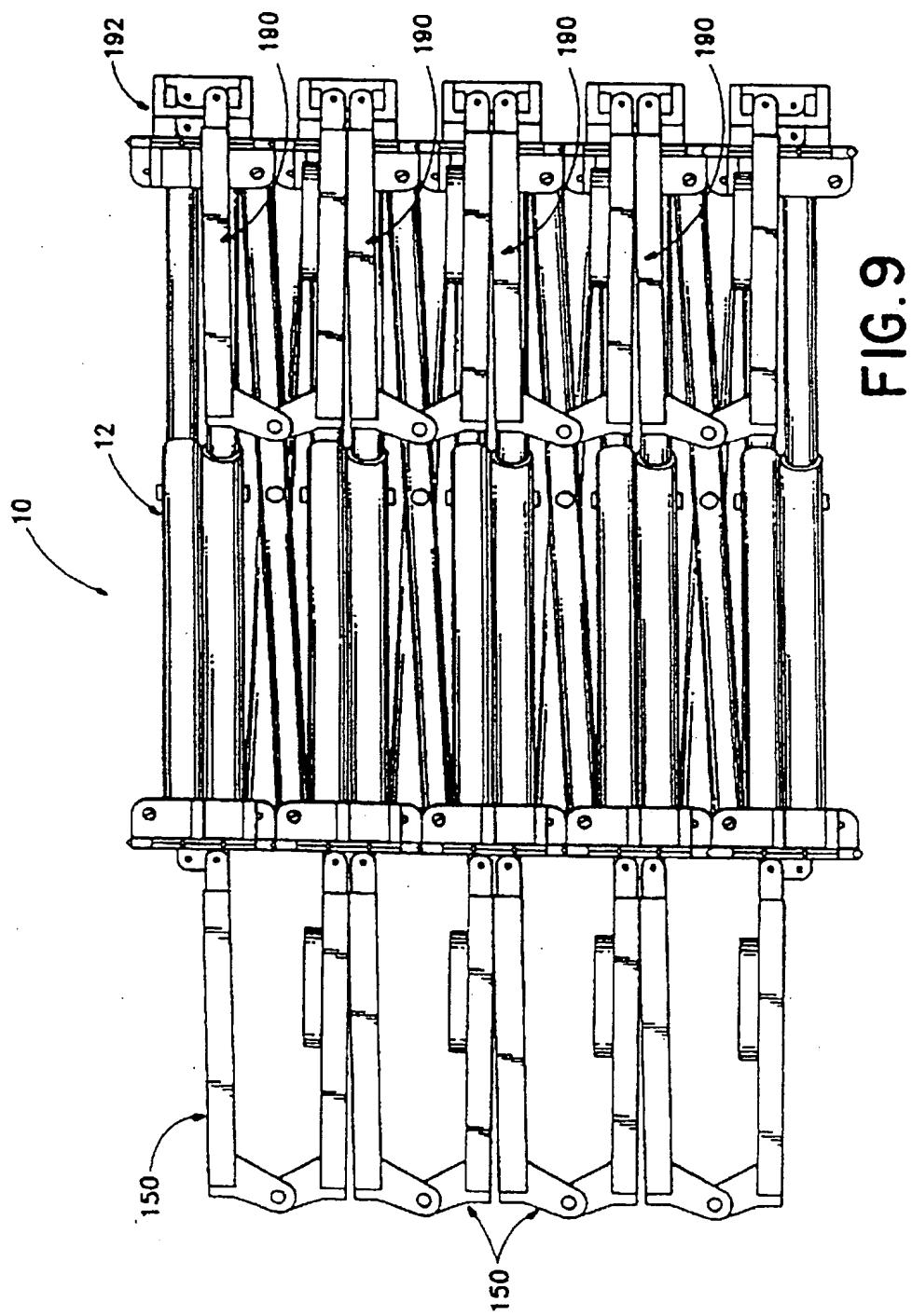
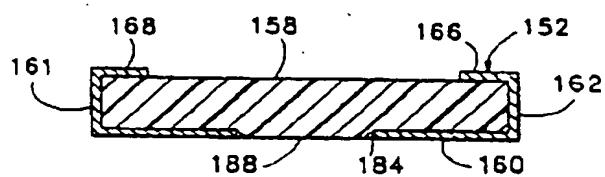
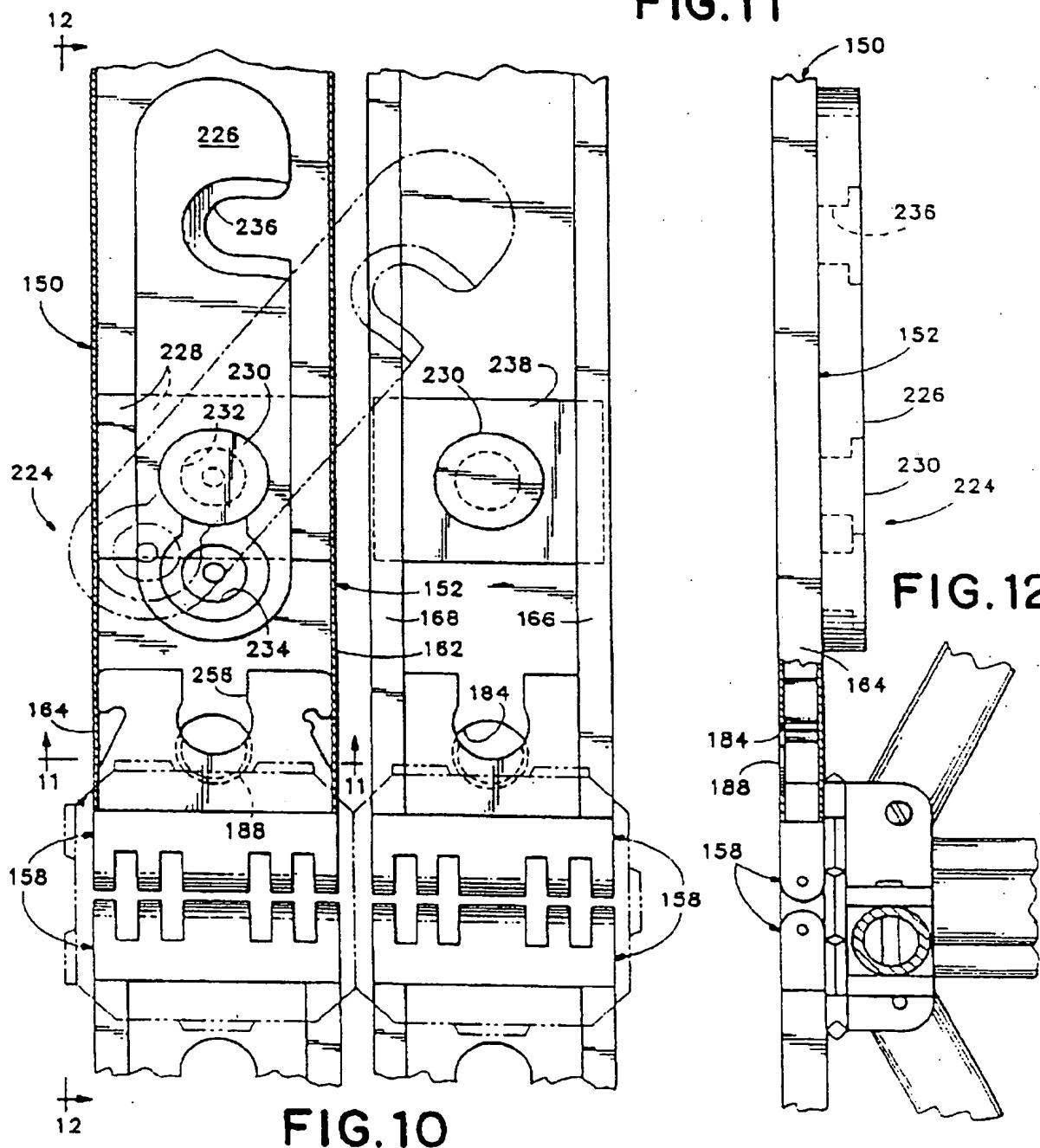


FIG. 9

**FIG.11****FIG.10**